Coupling Hands-on Geoscience Education with Riparian Restoration in the Red River Basin, North Dakota

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Biographical Sketch of Authors
Charlene Crocker is a chemist and Research Scientist at the Energy & Environmental Research Center. She is a co investigator in regional education and outreach programs, providing hands-on geoscience and water resource educational opportunities for students and the public. David Rush is Environmental Projects Coordinator for the Red River Regional Council. He manages the Red River Basin Riparian Project and is a facilitator for the international Pembina River Basin Advisory Board. Daniel Daly, a geologist and Research Manager for the Energy & Environmental Research Center, currently manages water education-related activities and coordinates the Clean Cities Coalition for the Center. Mr. Daly has taken part in projects involving the assessment of energy resources, waste management practices, and government policy, including energy policy. Linda Kingery staffs the University of Minnesota-Northwest Partnership as Executive Director. The Partnerships promote active citizenship, partnership with the University and research, education, and outreach consistent with sustainable development principles. Loretta Monson teaches all sciences for grades 7-12 at Edinburg High School. She has been active in bringing hands-on educational experiences to her students. In addition to stream monitoring, Ms. Monson has engaged her students in Science Olympiad events, studying the effects of pollution on plant growth, and making DNA fingerprints.

Abstract
Geoscience is fundamental to an understanding of a river system and the impact of human activity on that river system. The Energy & Environmental Research Center implemented the Red River Geoscience Education (RRGE) project to bring teachers and geoscientists together to provide "hands-on, minds-on" field and classroom experience to high school students through application of geoscience to local river ecosystems. Through field observation, water sampling and analysis, and reporting results in a public forum, students develop an understanding of the interactions between nature and humans that determine the health of the river. RRGE equips students to use scientific principles and data in personal and community decision making.

Practical application of RRGE is demonstrated through collaboration with the Red River Basin Riparian Project (RRBRP). The goals of the RRBRP are to restore rivers of basin, to educate about the importance of riparian zones, and to monitor restored reaches. By teaming with Edinburgh High School, implementation and long-term monitoring of a restoration site on the Park River became part of the science curriculum. Secondary students collected chemical and biological samples from the river prior to restoration, assisted in the revegetation of the site, and now collect chemical, biological, and geomorphological data on the restored reach as part of RRGE. Linking local schools with riparian restoration sites provides hands-on education for the students and sustainable monitoring for the RRBRP, but also instills ownership of local watersheds. This type of collaboration could be emulated by other watershed education and restoration projects.